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FIELD SAMPLING PLAN

Riverside Agricultural Park Neighborhood Evaluation
Riverside, California 92503

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DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Table of Contents

Table of Contents

List of Figures

List of Tables

1. Introduction

1.1 PURPOSE

This Field Sampling Plan (FSP) describes the sampling investigation that will be conducted to collect data in the neighborhood of the Riverside Agricultural Park (Ag Park). The Ag Park property, located at 7020 Crest Avenue, Riverside, California (Figure 1) consists of approximately 62 acres. Based on previous sampling, polychlorinated biphenyls (PCBs) are known to be present within the property boundaries of the Ag Park property (Section 2.0). The Ag Park is bounded to the north by the Santa Ana River and open space, to the east, south, and west by residential neighborhoods. The areas being investigated (Figure 2 and 3) are immediately surrounding the Ag Park property and will be referred to as the Ag Park Neighborhood (Neighborhood).

1.2 OBJECTIVES OF SAMPLING EFFORT AND AREA

The primary objectives of the Neighborhood investigations are:

- To determine if PCBs in wind-borne particulates from the Ag Park property may have migrated to neighborhood areas, and
- To evaluate if PCBs in wind-borne particulates from the Ag Park property are above established screening levels (Section 3.3) in soil.

Sample locations (Figures 2 and 3) include 25 properties within the Neighborhood. These properties are:

- East and west of Crest Avenue, north of Mandalay Court and Manitoba Place, east of the northern extension of Keating Drive, west of Rutland Avenue (both north and south of Jurupa Avenue), and Rutland Park.

1.3 RESPONSIBLE AGENCY

The DTSC is the lead agency providing oversight of this sampling investigation. Other supporting agencies include: the United States Environmental Protection Agency (U.S. EPA) Region IX, the California Air Resources Board (CARB), California Department of Public Health (CDPH) and the City of Riverside (City) . The U.S. EPA and the City provided assistance to DTSC in the development and the review of the FSP. The CARB assisted DTSC in air dispersion modeling. The CDPH is working with DTSC and the Neighborhood Community Work Group to address the community's health concerns.

1.4 PROJECT ORGANIZATION

The following table presents the list of key project personnel, their contact information and responsibilities.

Key Project Personnel Contact Information and Responsibilities

Title	Name	Phone Number	Responsibilities
DTSC Project Manager	Amit Pathak	(714) 484-5468	Coordinates, organizes, and plans for sample collection activities.
DTSC Quality Assurance Officer (QAO)/Toxicologist	Riz Sarmiento	(818) 717-6596	Develops data quality objectives and decision inputs for risk assessment.
DTSC Field Team Leader	Greg Sweel	(714) 484-5413	Sample collection, documentation, packaging and shipment.

2. Ag Park and Neighborhood Background

The Ag Park was formerly part of the United States Army (Army) Camp Anza. A sewage treatment plant was constructed by the Army in 1942 to treat wastes generated at Camp Anza and occupied about 46 acres of the nearly 62 acre site. The easternmost 11 acres of the site and the northwestern most 2 acres of the site were separated from the former treatment plant area by natural drainages, and have been historically undeveloped. The Army operated the sewage treatment plant from 1942 to 1947. Anza Realty Company operated sewage treatment plant from above 1947 to 1953. The Anza Utility Company, later known as Arlington Utility Company, operated the sewage treatment plan from 1953 to 1962. The City owned the property since 1962 and operated the treatment plant until 1965 when it was decommissioned, and the waste flow was diverted to another sewage treatment plant on Acorn Street which the City opened in 1942. The treatment plant on-site included filters, clarifiers, a digester, sludge drying beds, and brine basins. The plant reportedly accepted waste from industrial, commercial, and residential customers (Geomatrix, Revised RI Report, April 4, 2006). At various times since 1965, there have been intermittent recreational uses of the site such as: permitted bicycle motocross track (August 1997 – January 2002); and permitted agricultural livestock shows between 1981 and 1986.

2.1 GEOLOGICAL AND METEOROLOGICAL INFORMATION

The Ag Park and Neighborhood area is relatively flat with elevations generally decreasing to the north. The average site elevation is approximately 740 feet above mean sea level. There are two drainage features at the Ag Park which are both oriented in a north-south alignment, with one located along the western side of the site and the other located along the eastern side. The eastern drainage veers to the west along the northern side of the property and connects with the western drainage feature in the northwestern corner of the property. The drainage from the Neighborhood is generally towards the Ag Park. The site is located in the Upper Santa Ana River Drainage Area, which includes the Upper Santa Ana Valley, San Jacinto Valley, and Elsinore Valley. The boundaries of the Upper Santa Ana River Drainage Area are the San Gabriel, San Bernardino, and San Jacinto Mountains (northern and eastern boundaries), and the Chino Hills and Santa Ana Mountains (western and southern boundaries). The bordering mountain ranges and basement rock include Mesozoic-age granitic, metamorphosed clastic and volcanic rocks. The Upper Santa Ana River Valley in the vicinity of the site includes Recent-age alluvium, Pleistocene-age non-marine sedimentary rocks, and exposed areas of Mesozoic-age granitic basement rocks.

The Santa Ana River, located approximately 1,800 feet north of the Neighborhood, is the principal surface water drainage feature in the area. The Santa Ana River begins in the San Bernardino Mountains and flows to the southwest across the Upper Santa Ana River Valley to the Santa Ana

Canyon below Prado Dam. The Santa Ana River then crosses the coastal plain of Orange County and discharges to the Pacific Ocean between Newport and Huntington Beaches.

The Ag Park soils from the ground surface to a depth of approximately 4 feet bgs are predominantly fine-grained, reddish brown to brown clay, silt, sandy silt, and silty sand. This typical lithology generally grades to weathered granite throughout the site. From approximately 7 to 10 feet bgs the granite is less weathered and more competent. In some places, refusal was encountered between 5 and 9 feet because of the hardness of the granitic bedrock. The off-site northwest drainage consists of approximately 6 inches to 3 feet of loose, sand, underlain by weathered granite and granitic bedrock.

The average annual temperature in Riverside is 65.45 degrees Fahrenheit (°F). The average annual high temperature is 79.5oF and the average annual low temperature is 51.4°F. The average annual precipitation is 10.32 inches of rainfall. Typical average wind speeds vary from 0 mph to 14 mph, occasionally exceeding 20 mph. The wind direction is most often out of the northwest (25% of the time) and west (15% of the time). The wind is least often out of the southwest (3% of the time), northeast (4% of the time), and east (5% of the time).

2.2 PREVIOUS INVESTIGATIONS AT THE AG PARK AND NEIGHBORHOOD

In July 2003, during demolition of the treatment plant structures, a contractor working on behalf of a residential developer (The Friends of the Riverside Airport) punctured the sidewall of the digester and sludge was released to the adjacent soil. The City was notified of the sludge release and initially responded by removing approximately 51,000 gallons of sludge from the spill and 30 cubic yards of sludge-impacted soil. Analytical results of a sample collected from the sludge reported PCB (as Aroclor-1242) at a concentration of 4930 milligrams per kilogram (mg/kg). Following the City's discovery that the released digester sludge contained PCBs, the City notified the developer to cease all further demolition activities and restricted access to the site.

In August 2003, another City contractor collected soil samples at the site in response to the discovery of PCBs in the sludge. The highest concentration of PCB detected (499 mg/kg) was detected in samples near the digester. In December 2003, a contractor working on behalf of the Friends of the Riverside Airport collected soil samples to depths up to 10 feet below ground surface (bgs) and from around the perimeter of the site. Generally, PCBs were detected in samples shallower than 3 feet bgs. The highest concentration (9,560 mg/kg) of total PCBs was detected at a depth of 0.75 feet bgs.

On June 21, 2004, the County of Riverside approved a "Sampling, Analysis, Demolition and Debris Consolidation Plan", dated June 15, 2004, and prepared by Geomatrix Consultants, Inc. (EnviroStor).

In July 2004, a contractor employed by the City excavated and sampled 47 test pits to depths up to 11 feet bgs at locations around the former treatment plant facilities, on-site drainages, and the perimeter of the site. A second phase of sampling was performed in August 2004 during which 18 additional test pits were excavated to 2.5 feet bgs and sampled in the on-site drainages and the perimeter of the site.

In September 2004 a third phase of sampling was performed at 18 additional test pits in and around the south and southwestern portions of the site, and from 8 test pits at four (4) residential properties in the Neighborhood (2 test pits at each residential property) to depths of 2.5 feet bgs. The 4 properties investigated were located immediately adjacent to the southern perimeter of the former Ag Park (Figure 4). Reported concentrations of PCBs collected from these locations were either non-detect (11 of 16 samples) or below the Preliminary Remedial Goal (PRG) of 0.22 mg/kg for residential uses (5 of 16 samples).

Based on the findings of three phases of sampling, three (3) further phases of sampling were performed in October 2004 at on-site and at the off-site drainage northwest of the Ag Park. In total, 16 additional test pits were excavated on-site and 16 additional test pits were excavated in the off-site drainage northwest of the Ag Park during the fourth through sixth phases of investigation. Reported detections of PCBs in the northwest drainage were above the residential PRG near the Ag Park boundary, but did not persist further than 1,000 feet from the Ag Park boundary.

Analytical test results from samples collected during 2004 indicated that the highest PCB concentrations were present in soils near the former treatment plant at depths up to 4 feet bgs. Lower concentrations of PCBs were detected at depths to 10 feet bgs in the former treatment plant area. PCBs were detected in surficial and shallow soils across much of the central portion of the Ag Park at levels above the residential PRG that was established by the United States Environmental Protection Agency (USEPA) in 2004. Reported concentrations of PCBs in samples collected from residential properties south of these areas and along the majority of the Ag Park boundary were either non-detect or below the residential PRG, except for the south-southwestern portion where PCBs were detected above the residential PRG in two (2) areas.

On April 4, 2006, the City prepared a "Revised Remedial Investigation Report" which presented the findings from the implementation of the 2004 "Sampling, Analysis, Demolition and Debris Consolidation Plan". On April 28, 2005, DTSC entered into a Voluntary Cleanup Agreement (VCA) with the City. The VCA included DTSC review of documents provided by the City and to provide comments as needed. On May 12th 2006, the City and DTSC signed an Amendment to the VCA, and expanded the Scope of Work to conduct an evaluation of the northwest drainage area and the groundwater.

On May 1, 2006, the Friends of the Riverside Airport LLC purchased the property from the City and prepared a response plan intended to excavate soils impacted by PCBs to concentrations below the residential PRG prior to development of the site. The response plan estimated that an area of approximately 35 to 40 acres contains concentrations of PCBs greater than the residential PRG and extends to depths of up to 15 feet bgs. Implementation of the response plan was delayed until April 2009 when the first phase was initiated to excavate soils with PCB concentrations greater than 50 mg/kg. The first phase was completed in July 2009. Approximately 8,666 tons of soil was excavated. All excavated soil with PCB concentrations at or above 50 mg/kg was transported offsite to the Waste Management, Incorporated (WMI), located in Kettleman City, California. Additional items removed from the site included: brush debris (green waste); PCB contaminated concrete, sewer pipe, and utility poles. The second phase of the response plan was intended to excavate soils with PCB concentrations greater than the residential PRG of 0.22 mg/kg.

On June 10, 2010, DTSC approved the Final Phase 1 Response Plan Implementation Report.

On September 7, 2010, and October 18, 2011, DTSC requested additional assessment of off-site soil, groundwater, and Santa Ana River sediment from the City. On December 10, 2012, DTSC approved the Workplan for Off-Site Groundwater and Santa Ana River Sediment Sampling and Analysis. The Workplan was implemented in April 2013 wherein additional sediment samples were collected from the bed of the Santa Ana River. The potential for groundwater to move from the northern Ag Park boundary toward the river was also assessed.

In August 2013 the second phase of response plan was implemented. Approximately 165,226 tons of soil were excavated and transported for off-site disposal.

On October 1, 2013, DTSC received the results from implementation of the Off-Site Groundwater and Santa Ana River Sediment Sampling and Analysis Work Plan. The results of the investigation indicated that groundwater samples collected in the areas most likely to intercept groundwater emanating from the site did not contain levels of (PCBs) above laboratory reporting limits and stream bed sediment samples did not exhibit PCB results above the laboratory reporting limits in any of the samples collected. In a letter dated January 7, 2014, DTSC requested that an additional biological survey be conducted to confirm the assumptions regarding habitat quality and food availability. DTSC also requested the collection of confirmation samples to be analyzed for PCBs detected in 2004. On February 18, 2014, a work plan was prepared on behalf of the City to conduct an additional biological survey and confirmation soil sampling in the drainage located northwest of the Ag Park.

In March 2014 the Phase 2 Response Action Implementation Report was submitted and was approved by DTSC on April 1, 2014. DTSC subsequently issued the site a Certificate of Completion. On May 19, 2014, DTSC determined that no further action would be required for the Off-Site Northwest Drainage Area. Following the issuance of the Certification of Completion and No Further Action determinations, the site was graded for residential development. Individual residential lots were rough graded as well as all public right of ways, including sidewalk and street areas. Within the future Jurupa Avenue extension utility installation had begun including the installation of some sewer and stormwater control features.

On March 5, 2015, the Director of DTSC received a letter from the Center for Community Action and Environmental Justice (CCAEJ) requesting that DTSC investigate specific issues concerning the site history and efficacy of cleanup activities at the site. On July 23, 2015, the Director of DTSC requested assistance from the U.S. EPA Region IX in reviewing the adequacy of prior site remediation activities. On August 28, 2015, a Soil Assessment and Groundwater Monitoring Well Installation Work Plan was prepared on behalf of the Friends of the Riverside Airport to reconfirm that the site was adequately cleaned up during historic remedial actions. On September 1, 2015, 39 surface soil samples were collected from 39 grid locations based on a 250-foot grid pattern across the Ag Park.

Reported concentrations ranged from non-detect to a maximum total PCB concentration of 18.2 mg/kg. All detected metals concentrations are below the EPA Regional Screening Levels (RSLs), with the exception of arsenic. Arsenic was within the background range for the Park. All metals results are consistent with the soil background concentrations. The Toxicity Equivalency Factors (TEQs) for all the samples tested for dioxin/furan congeners and homologs were below the EPA RSL of 4.8 picograms per gram [pg/g] as well as the DTSC Interim Remediation Goal of 50 pg/g (DTSC/HERO HHRA Note 2, 2009). Perchlorate was not detected above the laboratory reporting limit (5.8 micrograms per kilogram) in any soil sample.

On October 28, 2015, an addendum Soil Sampling Work Plan was prepared to collect surface soil samples on a 125-foot grid pattern across the entire Ag Park. This sampling was intended to completely characterize the elevated PCB concentrations detected at two grids (B4 and F3) and to clarify uncertainties on data variability between the extraction methods for PCB analysis used by DTSC and the EPA. The analytical results indicated previously undiscovered pockets of PCBs needing further remediation.

On February 2, 2016, DTSC sent a Notification of Need for Additional Remediation at the Park to the Friends of the Riverside Airport requiring that all construction work be halted until the removal is completed and approved by DTSC. On February 10, 2016, DTSC received the Soil Sampling and Excavation Work Plan for additional assessment and cleanup activities at the Ag Park. On March 21, 2016, DTSC conditionally approved the Soil Sampling and Excavation Work Plan, and soil sampling activities began the following day.

On May 4, 2016, DTSC issued a Public Notice proposing to create a Neighborhood Work Group (Work Group) to provide feedback on off-site activities.

On July 21, 2016, DTSC issued a Work Notice regarding the beginning of cleanup activities, and on August 4, 2016, sent a letter to the Work Group informing them of implementation of remedial activities. On August 5, 2016, DTSC sent a letter to the Friends of the Riverside Airport which approved the implementation of the excavation portion of the Soil Sampling and Excavation Work Plan.

In September 2016 the excavation work at the Ag Park began and is currently underway.

3. Data Quality Objectives

The data collection activities are premised on the data quality objectives that were developed for the project. The U.S. EPA initially developed the Data Quality Objectives (DQOs) process in 1994, and the development of these project-specific DQOS is consistent with the "Guidance on Systematic Planning using the Data Quality Objectives Process" (EPA, 2006). The DQO-based approach ensures that the information being collected, the quality and quantity of the samples meet the objective of evaluating the neighborhood beyond the Park.

The DQO process consists of seven steps and each step defines the criteria that will be used to develop the sampling design. The goal of these investigations is to collect data that can support the decision-making process. In the event that multiple phases may be required, the DQO process makes it possible for the project team to define the requirements for each phase.

3.1 STEP 1: STATE THE PROBLEM

There are two stated problems that will be addressed by the data that will be collected, namely:

- It is unknown if PCB-containing particulates from the Ag Park had been deposited in the neighborhood soil by wind, and
- It is unknown if concentrations of PCB-containing particulates in the surficial soil are above established soil screening levels.

The inputs for identifying the stated problems include the site-specific conceptual site model (CSM), supporting agencies and the Work Group. The CSM (Figure 5) shows how PCBs in particulates could potentially come in contact with human receptors in the neighborhood through specific exposure routes. Soils in the neighborhood area will be sampled to determine if PCB-containing particulates from Ag Park were deposited to soils in the neighborhood. The human receptors who could be potentially exposed include neighborhood adult and child residents. In addition, to address community concerns, samples will be collected to evaluate potential exposures, if any, of recreational users in a nearby park (Rutland Park).

3.2 STEP 2: IDENTIFY THE GOALS OF THE STUDY

The second step of the DQO process identifies the question that will be addressed by these investigations, and the corresponding actions that may result when the study question is answered.

- Study Question: Were PCBs from the Ag Park deposited in the neighborhood due to wind dispersion?

Actions: 1). No further action if PCBs are not detected.

2). If PCBs are detected, then compare highest PCB concentrations to established soil screening levels.

3). If highest PCB concentration is below the established soil screening levels, then no further action.

4). If highest PCB concentration is above the established soil screening levels at a property, then

a) Engage the Responsible Parties for additional investigations and potential remedial actions, and/or

b) Calculate the 95% Upper Confidence Limit (UCL) of the PCB concentration Calculation of the 95% UCL will require collection of additional samples,

If the 95% UCL concentration is below the established soil screening levels/risk-based levels, then no further action.

5) If the 95% UCL concentration is above the established soil screening levels/risk-based levels, then engage Responsible Parties for additional investigations and potential remedial actions.

3.3 STEP 3: IDENTIFY INFORMATION INPUTS

- Results of the air dispersion modeling conducted by the CARB – The approach is to collect the soil samples in the areas where the predicted maximum concentration of PCBs may have been deposited in the Neighborhood. The results will represent the worst case scenario, thus, if the soil data demonstrate that there was no deposition of particulate-borne PCBs above health protective concentrations, then no additional sampling is warranted.

- Evaluation Area – It is anticipated that soil data will be collected from up to 25 properties which include 23 residential properties, Rutland Park (identified by the Work Group), and at another location owned by the City.

- Analyte List – Results of several investigations at the A demonstrated that PCBs (Aroclors) have been identified as the key chemicals of potential concern (COPCs), in the human health risk assessment.

- Analytical DQOs – Laboratory requirements for precision, accuracy, representativeness, completeness, comparability (PARCC) will be determined with the analytical laboratory. PARCC are criteria established to assess the quality and usability of the data.

- Exposure Pathways - The Risk Screening Levels (RSLs) published by the U.S. EPA are based on potential exposure routes through ingestion, dermal contact, and inhalation of vapors/particulates.

3.4 STEP 4: DEFINE STUDY BOUNDARIES

The lateral boundaries of the sampling activities include areas identified by the air dispersion modeling, as discussed below. The air dispersion modeling results depict the predicted highest concentration of particulate-borne PCBs.

The vertical boundaries of the sampling activities will be from the ground surface and not deeper than six inches below the ground surface (bgs) because PCBs bind tightly to soil, have a very low solubility, and do not migrate deeper into the soil column. However, based on input from the Work Group and City, a subset of samples will be collected from up to 5 feet bgs to evaluate the potential for soil disturbances post-deposition and possible spreading of sludge generated from the treatment plant.

3.4.1 AIR DISPERSION MODELING

Air modeling is a mathematical simulation of how air pollutants disperse in the atmosphere. It is performed with computer programs that solve the mathematical equations and algorithms which simulate the pollutant dispersion. The CARB Modeling and Meteorology Branch assigned staff specialized in air modeling to assist DTSC with this effort.

AERMOD and CALPUFF models were used to calculate and project potential PCB deposition via wind-blown particulates. Both models are recommended by the U.S. EPA for regulatory usage. They have been extensively evaluated and well documented, and have been widely used in various applications.

The Ag Park PCB data used for the air modeling are: (a) data collected prior to the Phase 1 cleanup (2003 to 2009); (b) data collected during the Phase 1 cleanup period (4/2009 to 7/2009); (c) data prior to Phase 2 cleanup (8/2009 to 7/2013); (d) Phase 2 cleanup period (8/2013 to 1/2014) and; (e) post Phase 2 period (2014 to current). The Ag Park was divided into five areas for air modeling (Eastern Edge Area A1, Western Edge Area A2, Phase II cleanup Area A3, Phase I cleanup Area A4, and remaining Area 5). Three different scenarios were considered for both AERMOD and CALPUFF models. The scenarios considered were based on PCBs 1) Central Tendency Values or Average Concentrations 2) High End Values 3) Maximum Values. These values were based on the PCBs data from Year 2003 to 2015. These three scenarios were used to evaluate model sensitivity.

Surface weather (wind speed, direction, etc.) and precipitation measurements from Riverside Municipal Airport, along with upper air radiosonde data from Miramar Naval Air Station (near San Diego), were used to generate model-ready meteorological data sets.

Appendix 1 contains the ARB air dispersion modeling inputs and Appendix 2 contains the modeling output. Both AERMOD and CALPUFF models outputs show overall agreements for the scenarios considered and also agreements among the three scenarios. The output of the models show predicted relative PCB concentrations in the neighborhood represented by different colors (Appendix 2). For example, the orange color shows the area with predicted highest PCB concentrations and the lighter blue color shows the area with lowest predicted PCB concentrations.

The most conservative output scenario (based on maximum PCB concentration values at the Park) was selected under AERMOD for identifying neighborhood areas for soil sampling (See Appendix 2, AERMOD Scenario 3). The output of AERMOD Scenario 3 was overlaid on the neighborhood area map to show the properties where samples will be collected (Figure 2). Figures 2 and 3 show proposed residential properties, Rutland Park and City owned areas proposed for soil sampling.

3.5 STEP 5: DEVELOP THE ANALYTIC APPROACH

This step identifies the action level and the population parameter that will be used to support the decision-making process.

Action Levels – initial screening criterion is the residential soil RSL for Aroclor, i.e., 0.22 mg/kg based on a target cancer risk of 1E-06 (EPA, May 2016). Also, health risk-based scenarios will be utilized to evaluate potential exposures to recreational (Rutland Park) users. The comparison to residential RSL is the most conservative approach. Risk-based levels for the recreational scenario will be calculated if detected PCBs in the park exceed the residential RSL.

The population parameter (e.g., maximum or 95% UCL) is the concentration that will be compared to the action level to support a decision. The outputs of Step 5 are Decision Rules (listed below).

Decision Rules:

Actions: 1). No further action if PCBs are not detected.

2). If PCBs are detected, then compare highest PCB concentrations to established soil screening levels.

3). If highest PCB concentration is below the established soil screening levels, then no further action.

4). If highest PCB concentration is above the established soil screening levels at a property, then

c) Engage the Responsible Parties for additional investigations and potential remedial actions, and/or

d) Calculate the 95% Upper Confidence Limit (UCL) of the PCB concentration Calculation of the 95% UCL will require collection of additional samples,

If the 95% UCL concentration is below the established soil screening levels/risk-based levels, then no further action.

5) If the 95% UCL concentration is above the established soil screening levels/risk-based levels, then engage Responsible Parties for additional investigations and potential remedial actions.

3.6 STEP 6: SPECIFY PERFORMANCE OR ACCEPTANCE CRITERIA

Decisions are usually based by performing a statistical hypothesis test on the collected data, i.e., the error rates of the data collection. However, the scope of the data collection activities is limited to a few initial samples rather than on a statistically-based sampling design. Therefore, this step in the DQO process discusses the following uncertainties associated with the sampling design:

- Uncertainties in the air modeling results influence the uncertainties in the sampling.
- Collecting a limited number of samples in the neighborhood could potentially underestimate or overestimate the magnitude of exposures and the associated potential health risks.
- Using the highest concentrations to represent human exposure could overestimate the potential health risks.

3.7 DEVELOP THE PLAN FOR OBTAINING DATA

The sampling approach discussed in the following sections is based on the project-specific DQOs discussed in this section.

4. Data Review

Data review will be performed by DTSC's Environmental Chemistry Laboratory (ECL), or contract laboratory, using qualifiers on the analytical data, if necessary. The ECL will place qualifiers on the data based on the Instrument Detection Limits (IDL), Method Detection Limits (MDL), Laboratory Control Samples (LCS), and possible matrix interference. The ECL will indicate in the laboratory case narrative any corrective actions applied which could include rejection of data, re-analysis or recommendations for resampling.

5. Data Management

The Field Team Leader will ensure that data are transferred accurately from collection to analysis to reporting. Use of field notes and photographs will be used to record and review the data collection processes.

6. Soil Sampling Design and Rationale

Soil samples will be collected from up to four (4) locations at each evaluation area. The location of each sample will be determined in advance by consulting the property owner to gain access. A Consent for Access to Property will be provided to each property owner for review and signature prior to sample collection. Site specific restrictions which may limit sample collection could include extensive hardscape, irrigation systems, known electrical or plumbing lines. After access has been granted by each property owner, an initial site walk will occur to view the area for optimal sample collection. Sketches of each property will be created which depict the sample locations.

7. Field Equipment

A list of all the equipment that will be used in the field to collect samples, including decontamination equipment, is included in Table 1.

8. Soil Sampling Methods and Procedures

Surface soil samples will be collected within 6 inches of the ground surface. Single use, individually wrapped and sealed hand trowels/scoops will be used to collect the surface samples and then transfer samples to the appropriate containers. For deeper samples (up to 5 feet bgs) a hand-auger will be used. Attempts will be made to collect samples at 2.5 and 5 feet bgs. Care will be taken to ensure that any surface debris such a leaves, rocks, twigs, lawn cuttings, etc. will be excluded from the sampling containers.

The exact soil sampling locations will be determined in the field. The criteria that will be used to determine sampling locations will include accessibility. Soil sample locations will be recorded in the field logbook as sampling is completed. A sketch of the sample location will be entered into the logbook and any physical reference points will be labeled. If possible, measured distances to the reference points will be given.

Surface soil samples will be collected as grab samples (independent, discrete samples) from a depth of 0 to 6 inches (bgs). Surface soil samples will be collected using a hand trowel/scoop. Samples to be analyzed for PCBs will be placed in a sample-dedicated disposable pail or bucket and homogenized. Material in the pail will then be transferred from the pail to the appropriate sample containers. Sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being closed to prevent potential contaminant migration to or from the sample. See Section 11.0 for preservation and shipping procedures. Duplicate samples will be collected at a rate of 10 percent.

A subset of sampling locations will be selected for deeper sample collection using a decontaminated hand-auger. The exact location for the deeper samples will be determined at the time of sample collection and may be randomly selected or based on information pertaining to possible sludge spreading provided by the Work Group or the City. Each deeper sample will be hand-augered at the same location as the companion surface sample. Soil removed from the hole created by the hand-auger will be placed into a sample dedicated pail or bucket and homogenized. Sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being closed to prevent potential contaminant migration to or from the sample. Soil cuttings will be placed back into the holes created by the hand-auger and supplemented with potting soil to original grade.

Each sample container will be labeled and sealed with tamperproof custody tape (Section 11). Section 13 describes sample documentation and chain-of-custody procedures.

Personnel involved in sampling must wear clean, disposable gloves of the appropriate type specified in the approved "Hazard Appraisal and Recognition Plan" (Section 16).

Dedicated sampling will be utilized for the surface sample collection; therefore, no decontamination of equipment will be necessary. Disposable equipment intended for one-time use will be packaged for appropriate disposal. Each hand-auger will be washed prior to use in a 5-gallon plastic bucket using powdered detergent and water followed by two additional rinses with clean water. Each hand-auger will be inspected after cleaning to ensure all visible soil is removed prior to use. Equipment blanks will be collected to evaluate the effectiveness of the decontamination procedures. The equipment blanks will be collected after decontamination by pouring clean water over the hand-auger and allowing the water to collect in a glass jar for analysis of PCBs. Equipment blanks will be collected at a rate of 10 percent.

9. Analysis Narrative

All samples will be analyzed for PCBs (as Aroclors) by the ECL, or their contract laboratory, utilizing USEPA Method 8082 and using the Soxhlet Extraction procedures. A standard turnaround time will be requested for this project. Each sample will be placed into cleaned and certified glass jars. No preservatives are required for Method 8082 other than maintaining the samples at 4^0 Celsius (+/- 2^0) during shipment and pending analysis. The laboratory holding time after sample extraction is 30 days.

The analytical laboratory will utilize matrix spike (MS) and matrix spike duplicate (MSD) samples by spiking known quantities of PCBs at the laboratory. The analytes used as spiking compounds will depend upon the analytical method used. MS and MSD samples are a form of laboratory quality assurance/quality control (QA/QC) for determining matrix effects and the reliability of the analytical processes and equipment. The matrix effect is a condition in which sample composition interferes with the analysis of the desired analyte. Spiked sample recovery supplies percentage recovery information so that the laboratory can evaluate its measurement accuracy. MS and MSD samples are equal portions of a single initial sample that has been spiked in the laboratory with specific analytes in known quantities and the analytical results must meet laboratory requirements to be acceptable.

10. Sample Containers, Packaging and Shipping

All soil samples will be placed into pre-cleaned and certified glass jars. Soil samples for PCBs will be homogenized and transferred from the sample-dedicated homogenization pail or bucket into wide-mouth glass jars. The samples will be placed into an ice chest chilled to 4 degrees Celsius immediately upon collection.

All sample containers will be placed in a strong-outside shipping container (a cooler). The following outlines the packaging procedures that will be followed:

1. Wet ice will be packed in Ziploc, double plastic bags. The drain plug of the cooler will be sealed with tape to prevent melting ice from leaking out of the cooler.
2. The bottom of the cooler will be lined with bubble wrap to prevent container breakage during shipment.
3. All screw caps will be checked for tightness prior to sealing the cooler for shipment.
4. All container tops will be secured with custody seals.
5. Sample labels will be affixed onto each container.
6. All sample containers will be wrapped in bubble wrap to prevent breakage.
7. All sample containers will be placed into heavy duty plastic zip-lock bags. Sample numbers will be written on the outside of each plastic bag with indelible ink.
8. Samples will be placed into a sturdy cooler(s) lined with a large plastic trash bag. The appropriate COC(s) will be placed in a zip-lock plastic bag affixed to the underside of the cooler lid.
9. Any empty space in the cooler with bubble wrap or Styrofoam peanuts to prevent movement and breakage during shipment.
10. Each ice chest will be securely taped shut with tape, and custody seals will be affixed to the front, right and back of each cooler.

11. Disposal of Residual Materials

In the process of collecting samples, different types of potentially contaminated Investigation Derived Waste (IDW) will be generated that include the following:

- Used personal protective equipment (PPE)
- Disposable sampling equipment
- Decontamination water

Used PPE and disposable equipment will be double bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any PPE and disposable equipment that is to be disposed of which can still be reused will be rendered inoperable before disposal in the refuse dumpster. The decontaminaton water will be tested and managed appropriately.

12. Sample Documentation

Detailed record keeping will be made in the field. These records will include field logbook(s) and photographs.

Field logbooks will be used to document where, when, how, and from whom any vital project information was obtained. Logbook entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will have consecutively numbered pages. All entries should be legible, written in black ink, and signed by the individual making the entries. At a minimum, the following information will be recorded during the collection of each sample:

- Sample location and description
- Site or sampling area sketch showing sample location and measured distances
- Sampler's name(s)
- Date and time of sample collection
- Designation of sample as composite or grab
- Type of sample (i.e., soil)
- Type of sampling equipment used
- Field observations and details related to analysis or integrity of samples (e.g., weather conditions, noticeable odors, colors, etc.)
- Preliminary sample descriptions (e.g., for soils: silty sand, dry)
- Lot numbers of the sample containers, sample identification numbers and any explanatory codes, and chain-of-custody form numbers
- Shipping arrangements (overnight air bill number)
- Name of recipient laboratory

In addition to the sampling information, the following specific information will also be recorded in the field logbook for each day of sampling:

- Team members and their responsibilities
- Time of arrival/entry on site and time of site departure

- Other personnel on site
- Summary of any meetings or discussions with others
- Deviations from sampling plans, site safety plans, and QAPP procedures
- Changes in personnel and responsibilities with reasons for the changes
- Levels of safety protection

Photographs will be taken at the sampling locations and at other areas of interest on site or sampling area. They will serve to verify information entered in the field logbook. For each photograph taken, the following information will be written in the logbook or recorded in a separate field photography log:

- Time, date, location, and weather conditions
- Description of the subject photographed
- Name of person taking the photograph

All samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. The samples will have pre-assigned, identifiable, and unique numbers. At a minimum, the sample labels will contain the following information: location, date of collection, and analytical parameter. Every sample will be assigned a unique sample number.

All sample shipments for analyses will be accompanied by a chain-of-custody record. Form(s) will be completed and sent with the samples for each shipment (i.e., each day). If multiple coolers are sent to a single laboratory on a single day, form(s) will be completed and sent with the samples for each cooler.

The chain-of-custody form will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until the samples are shipped, the custody of the samples will be the responsibility of DTSC. The sampling team leader or designee will sign the chain-of-custody form in the "relinquished by" box and note date, time, and air bill number.

A self-adhesive custody seal will be placed across the lid of each sample container. The shipping containers in which samples are stored (usually a sturdy ice chest) will be sealed with self-adhesive custody seals any time they are not in someone's possession or view before shipping. All custody seals will be signed and dated.

13. Field Quality Control Samples

Field quality control samples will include field duplicates and equipment blanks. As mentioned in Section 9, field duplicates will be collected and analyzed in the same manner as the initial sample to evaluate variability in heterogeneity, sample collection, and analysis. As mentioned in Section 9, equipment blanks will be collected to evaluate the effectiveness of cleaning the hand-augers. The rate of collection for both field duplicates and equipment blanks will be 10 percent.

14. Field Variances

As conditions in the field may vary, it may become necessary to implement minor modifications to sampling as presented in this plan. Modifications to the approved plan will be documented in the sampling project report.

15. Field Hazard Appraisal and Recognition Plan

DTSC's project-specific health and safety procedures will be followed in the field, including safety equipment and clothing that may be required, explanation of potential hazards that may be encountered, and location and route to the nearest hospital or medical treatment facility. A copy of the approved "Hazard Appraisal and Recognition Plan" is included as Appendix 5.

16. Sampling Results and Reporting

Following sample collection and laboratory analysis, the results will be compiled and evaluated. The results will then be discussed with the community members and the supporting agencies. Based on these discussions any future course of actions will be determined, if required. A final sampling report will be prepared and made available for review.

17. References

DTSC/HERO HHRA Note 2, 2009

EnviroStor (http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=33490087)

Geomatrix, Revised RI Report, April 4, 2006

Guidance on Systematic Planning using the Data Quality Objectives Process" (EPA, 2006)

Figures

Figure 1 - Riverside Ag Park Neighborhood Area

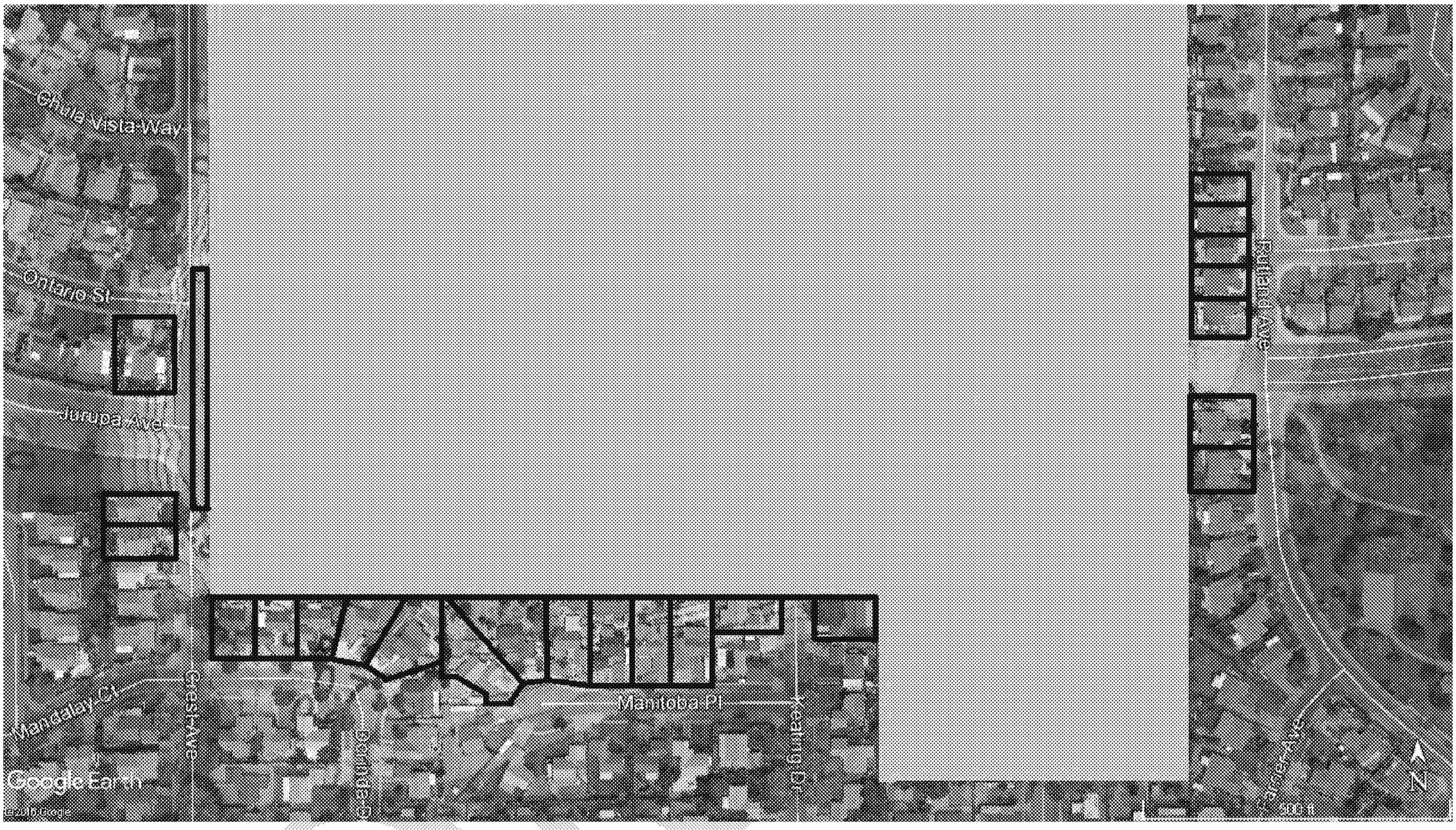


Figure 2 - Properties selected for sampling

Figure 3 - Rutland Park sampling locations

Figure 4 - Location of 4 properties sampled in 2004

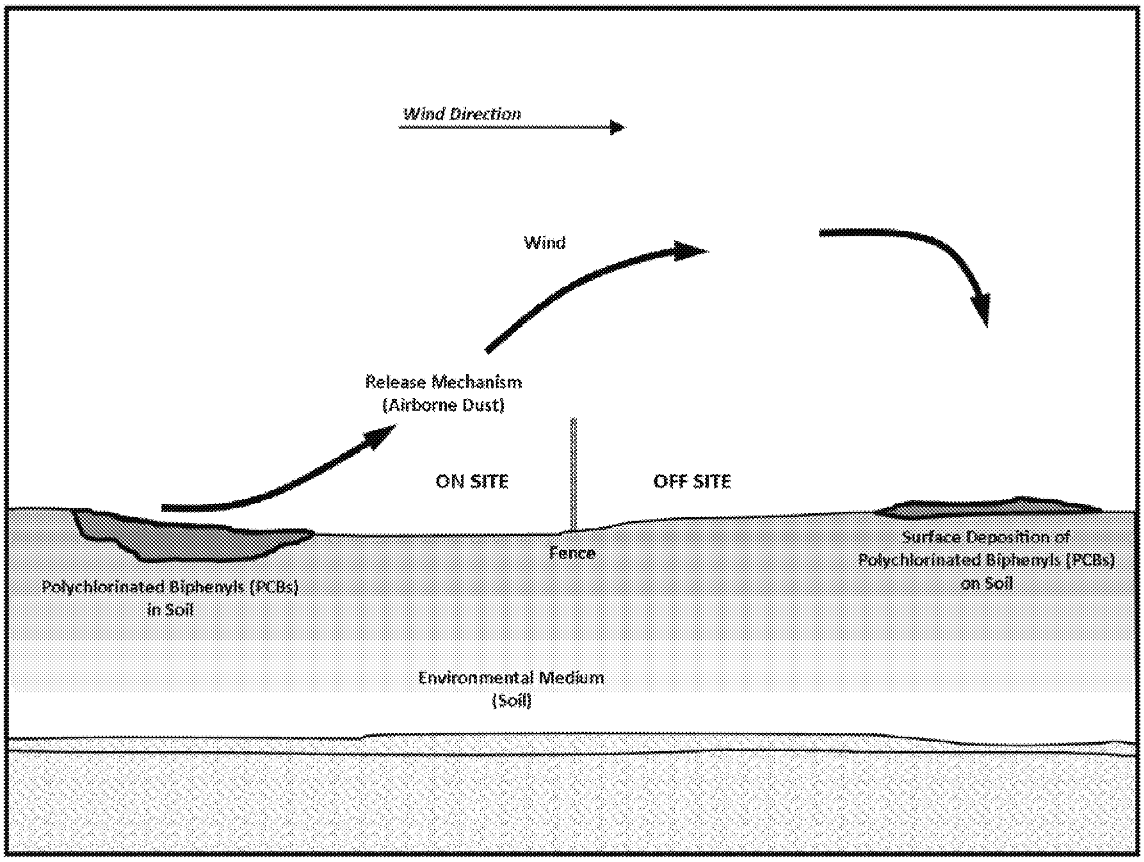
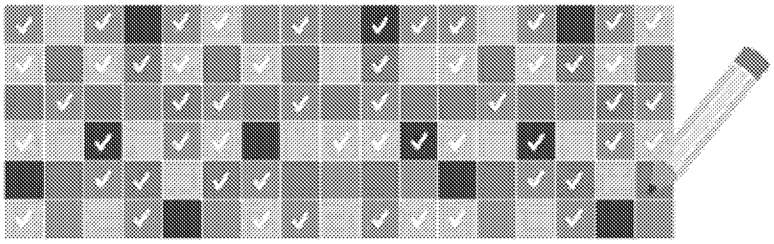


Figure 5 - Conceptual Site Model of Potential Release Mechanism

Tables

Table 1 Field Equipment Inventory Form



Field Equipment Form

Date ☐

Location ☐

Item	Quantity	
Sample Scoops	☐	☐
Hand-Augers	☐	☐
Handles & Rods for Augers	☐	☐
Plastic Sheets	☐	☐
Tape Measure	☐	☐
Camera	☐	☐
Field Notebook	☐	☐
ZipLock Bags	☐	☐
Wet Ice	☐	☐
Paper Towels	☐	☐
Cooler	☐	☐
Glass Jars	☐	☐
Sample Labels	☐	☐
	☐	
Waterproof Pens	☐	☐
	☐	☐
	☐	
	☐	

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Appendices

Appendix 1 Input Parameters for CARB Air Dispersion Modeling

Appendix

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Procedures to calculate PCB emissions from the Riverside Ag Park (DRAFT)

As suggested by DTSC staff, the whole modeling period is divided into three sub-periods:

a) Prior to and during Phase 1 cleanup: 7/2003 – 7/2009, during cleanup PCB emission rate is assumed to be same as in the period prior to the Phase 1 cleanup;
b) Prior to and during Phase 2 cleanup: 8/2009 – 1/2014, during cleanup PCB emission rate is assumed to be same as in the period prior to the Phase 2 cleanup; and
c) Post Phase 2 period: 2/2014 – 9/2016, this period includes part of the Phase 3 cleanup.

Based on the original request from DTSC, this analysis considers only the windblown emissions of PCBs from the park; vapor phase emissions of PCBs are not considered. Because PCB is emitted predominately by soil erosion in the park, it is reasonable to assume that the mechanism for PCB laden dust emissions is the same as that of the total suspended particulates (TSP). There is an important difference between PCB and TSP emissions: PCB emissions are high in patches of ground-level soil where PCB contents are high, and low in locations where PCB contents are low, while TSP emissions are approximately the same throughout the park.

PCB emissions are estimated in three steps. The first step is to estimate PCB concentrations in the soil from soil sampling data. The second step is to estimate TSP emissions based on meteorological data and soil type. The last step is to multiply TSP emissions by PCB concentrations in the soil to get PCB emissions.

1. Procedures to determine PCB concentrations in the park soil

The GIS geo-data provided by DTSC indicate a non-uniform PCB distribution for the post-Phase 2, 2015-2016 sampling in the Park (see Figure 1).

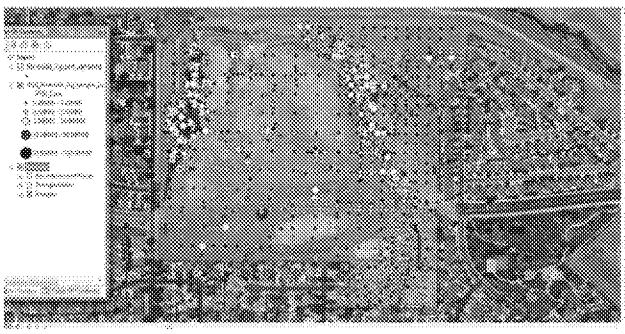

Figure 1. PCB distribution in the Park (post phase 2)

Based on the data and sampling locations shown in Figure 1, PCB concentrations in the soil will be estimated separately for five areas during each phase (see Figure 2):

1 | Page

10/06/2016

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Appendix

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Table 1. Five areas used for PCB emissions estimation based on the soil sampling data

Area	Size	Description
A1	~ 3.4 acres	The area having high PCB concentrations in the eastern part of the park, shown in green
A2	~ 2.3 acres	The area having high PCB concentrations near the west edge of the park, shown in blue
A3	~ 15 acres	Area cleaned up in Phase 2 but not in Phase 1, shown in [redacted]
A4	~ 15 acres	Phase 1 cleanup area, shown in yellow
A5	~ 30 acres	The remaining areas within the park with near-zero PCB concentrations, shown in white

Figure 2. The five areas used for PCB emission estimation based on post-phase 2 sampling data. The numbers are PCB concentrations. Please note only concentrations greater than 1 mg/kg are shown.

For each area and each phase, PCB concentration in the soil is assumed to be uniformly distributed.

Because A1, A2 and A5 have never been excavated, PCB concentrations are assumed to be constant during all modeling periods. Average concentrations in those three areas for all phases are estimated from the post-

2 | Page

10/06/2016

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Appendix

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Phase 2 soil sampling data. The following table describes how average PCB concentrations are assigned to each area for all phases.

Table 2. Estimation of average PCB concentrations in five areas

A1	A1 has not been subjected to any cleanups so far, thus the average PCB concentration for all phases can be estimated from the post-Phase 2 soil sampling data. The average concentration is estimated to be [redacted].
A2	Similar to how the concentration is estimated for A1, the average PCB concentration in A2 is estimated to be [redacted].
A3	<u>*The entire period up and including Phase 2 cleanup*</u> The average PCB concentration is assumed to be [redacted] because the Phase 1 cleanup area was determined to be anywhere with PCB concentrations greater than 50 mg/kg. The exact average concentration cannot be calculated from available data, so 50 mg/kg is solely based on the cleanup criterion.
	<u>*After the Phase 2 Cleanup*</u> Based on the soil sample data, the average PCB concentration is [redacted].
A4	<u>*Prior to and during Phase 1 Cleanup*</u> Assumptions: • The PCB concentrations outside of A3 have not changed throughout the modeling period, and the concentrations in A1 and A2 were 2.9 and 11.9 mg/kg, respectively; PCB concentration in A5 was 0.05 mg/kg. • The PCB concentration in A3 prior to Phase 1 was 7.5 mg/kg. • The average PCB concentration prior to Phase 1 for the entire park is 63.6 mg/kg. This is from a spreadsheet provided by DTSC, in the worksheet 'Summary' and the row for a sample depth of 0.5-2.5 ft. Calculations • The acreage for the entire park is 65 acres. The acreage of A3 is 15 acres. The acreage of A4 is 15 acres. The acreage outside of A3 is 35 acres. • Since we have estimates of the average PCB concentration prior to the Phase 1 cleanup for areas A1, A2, and A3, as well as for the entire park, we can now calculate the average PCB concentration in A4, which is denoted by 'X' below: 63.6 * 65 = (X * 15) + (7.5 * 15) + (2.9 * 3.4) + 11.9 * 2.3 – 0.05 *29.3 X = [redacted]
	<u>*Prior to and including Phase 2 Cleanup*</u> Assumption: • Each of the two cleanups reduced PCB concentrations with similar efficiency Conclusion: • The PCB concentration for A4 is estimated to be [redacted] because the average concentration

3 | Page

10/06/2016

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	within A4 after the Phase 1 cleanup should be about the same as the post-Phase 2 cleanup level in A3.
	After Phase 2 Cleanup Based on the post-Phase 2 soil sampling data, the average PCB concentration is [redacted] (after 2nd excavation/cleanup).
A5	A5 has not been subjected to any cleanups, because the average PCB concentrations for all phases are very small. For the baseline analysis, concentrations in A5 will be set to 0.05 mg/kg.

Note: the sampling depth for post-phase 2 data is 0 - 0.5 ft, and the depth for pre-phase 1 data is 0.5 ~ 2.5 ft.

In addition to the baseline scenario (referred to as central-tendency values) presented in Table 2, DTSC staff have requested three other scenarios for modeling. Table 3 provides PCB concentrations for all modeling periods and scenarios.

2. TSP emission rate calculations

TSP emissions are determined by the friction velocity, a micrometeorological parameter affected primarily by wind speed and secondarily by the vertical variation of temperature, and precipitation. For any hour with a measurable amount of precipitation (no less than 0.01 inch) recorded at the Riverside Municipal Airport, the TSP emission rate for that hour and the following five hours will be set to zero. For all other hours, hourly TSP emissions are calculated with a formula derived from wind tunnel soil dust measurement data (Macpherson et al, 2008, Journal of Geophysical Research, Vol. 113, F02S04):

$$E = 5.64 \times 10^{-12} u_*^{1.9744} \ in \ g/(cm^2 s)$$

where u_* is the friction velocity in cm/s (calculated from meteorological modeling). This formula, valid for an undisturbed surface, is taken from a 2008 Maricopa Co. PM_{10} Emission Inventory document. A correction factor of 100/52.3 has been applied to the formula so that the formula is valid for TSP other than PM_{10}. 52.3 is the percentage of PM_{10} in TSP for road and soil dust (US EPA, 1997, Guidance For Network Design and Optimum Site Exposure For $PM_{2.5}$ And PM_{10}, EPA-454/R-99-022).

It should be noted that methods for calculating an annual emission rate are not used here because they can't take the temporal variation of emissions into consideration. Examples of those methods include the US EPA's AP-42 and the ARB's method of estimating wind-blown dust from agricultural lands.

3. PCB emission rate calculation

As mentioned earlier, the PCB emission rate is calculated by multiplying the TSP emission rate by the PCB concentration in the soil. As such, the PCB emission rate varies hourly and by area in the park, and is determined by the friction velocity, precipitation, and PCB concentration in the soil.

Appendix

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Table 3. PCB concentrations to be used in the four modeling scenarios

Scenario 1 (central-tendency values)				
	Acres	Pre/During Phase 1	Pre/During Phase 2	Post-Phase 2
A1	3.4	2.9	2.9	2.9
A2	2.3	11.9	11.9	11.9
A3	15	7.5	7.5	7.2
A4	15	265.7	7.2	2
A5	29.3	0.05	0.05	0.05
Scenario 2 (high-end values)				
	Acres	Pre/During Phase 1	Pre/During Phase 2	Post-Phase 2
A1	3.4	2.9	2.9	2.9
A2	2.3	11.9	11.9	11.9
A3	15	25	25	7.2
A4	15	468	7.2	2
A5	29.3	0.22	0.22	0.22
Scenario 3 (maximum values)				
	Acres	Pre/During Phase 1	Pre/During Phase 2	Post-Phase 2
A1	3.4	37.0	37.0	37.0
A2	2.3	250	250	250
A3	15	50	50	500
A4	15	9650	50	95
A5	29.3	21.0	21.0	21.0
Scenario 4 (TSP only)				
	Acres	Pre/During Phase 1	Pre/During Phase 2	Post-Phase 2
A1	3.4	0	0	0
A2	2.3	0	0	0
A3	15	0	0	0
A4	15	0	0	0
A5	29.3	0	0	0

Appendix 2 CARB Air Dispersion Modeling Output

Appendix

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Results from Riverside Ag Park PCB Air Modeling Study

The objective of the study is to assist DTSC in identifying sampling locations where windblown PCB concentrations in the soil are most likely the highest.

Air dispersion modeling was conducted to estimate the relative distribution of PCB deposited over a 13¼-year period (from July 2003 through September 2016).

Both AERMOD and CALPUFF will be used to calculate PCB deposition. Both models are recommended by the U.S. EPA for regulatory usage. They have been extensively evaluated and well documented, and have been widely used in various applications.

Surface and precipitation measurements from Riverside Municipal Airport, along with upper air radiosonde data from Miramar Naval Air Station (near San Diego), were used to generate model-ready meteorological data sets. Miramar is the closest radiosonde site to the study area with a complete set of data for the entire modeling period. Although radiosonde data are required by AERMOD and CALPUFF, the choice of upper air site do not influence the air modeling results because for this study the maximum source-receptor distance is a few hundred meters, and during the transport and diffusion processes pollutants stay near the surface. Vertical profiles of meteorological variables within a few tens of meters of the surface are determined by surface observations only.

AERMET is AERMOD's meteorological pre-processor that generates all meteorological data needed by AERMOD. The meteorological field for AERMOD is horizontally uniform but vertically variable to reflect the vertical variations of meteorological variables such as wind shear. The CALPUFF model needs a 3-dimensional meteorological field to calculate transport and diffusion of the pollutants of interest. The 3-D meteorological data for CALPUFF are generated by CALMET, CALPUFF's companion model.

Since PCBs are emitted predominantly by soil erosion in the park, it is reasonable to assume the mechanism of PCB emissions is the same as that for total suspended particulates (TSP). However, there is an important difference between PCB and TSP emissions: PCB emissions are highest in areas where PCB concentrations are high, and lower in areas where PCB concentrations are low, while TSP emissions are approximately the same everywhere in the park. A detailed description of the steps to calculate emissions follows.

The entire modeling period is divided into three phases:

a) 7/1/2003 to the end of the 2009 clean up;
b) The period between the end of the 2009 cleanup and the end of the 2013/14 cleanup; and
c) From the end of the 2013/14 cleanup period to September 2016.

11/16/2016 Page 1

The temporal variation of PCB emissions is determined by wind speed and precipitation:

- In any hour during which a measurable amount of precipitation (no less than 0.01 inch) is recorded at the Riverside Municipal Airport, PCB emission in that hour and the following five hours is set to zero;
- In any hour during which a trace amount of precipitation is recorded, PCB emission is set to zero for that hour alone;
- In all other periods the hourly PCB emission rate is determined by wind speed because PCB emissions are assumed to be caused by soil erosion.

Due to the many uncertainties associated with this study, and with the objective of assisting subsequent sampling efforts, the air dispersion modeling results are presented in a normalized manner. That is, if the model results show that the estimated level at point A is higher than that at point B, then it is likely the measured level of windblown PCB deposition at point A is higher than that at point B. The result generated with the present air dispersion modeling is intended solely to provide an indication where the highest PCB levels due to windblown dust are likely to be found.

In the modeling, properties of PCBs are treated the same as those for TSP (total suspended particles) because PCB-laden soil particles are the carrier of PCBs.

CALPUFF and AERMOD modeling results are shown as follows.

The overall agreement between the CALPUFF and AERMOD modeling results for PCB deposition totals is good, with the exception that CALPUFF results do not have the high deposition levels on the lower half of the west boundary of the park.

Appendix

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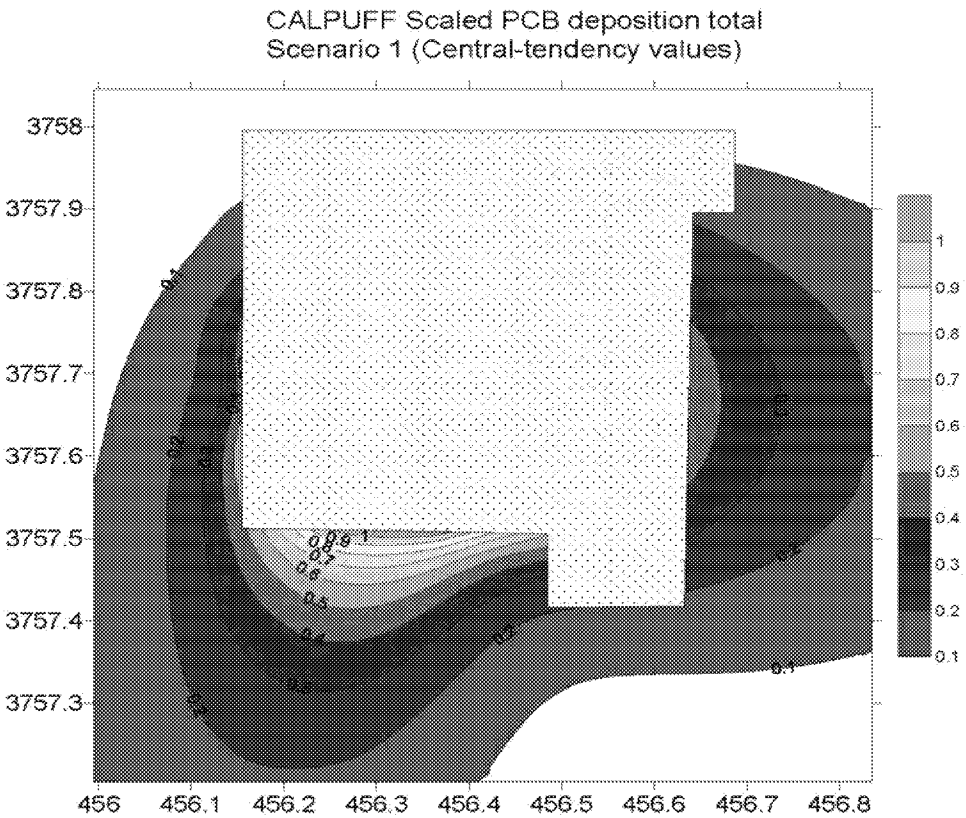

Figure 1A. Normalized (relative) distribution of PCB deposition from windblown dust obtained from CALPUFF modeling of Scenario 1. Coordinates along the x- and y-axis are UTM coordinates (km).

11/16/2016 Page 3

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Appendix

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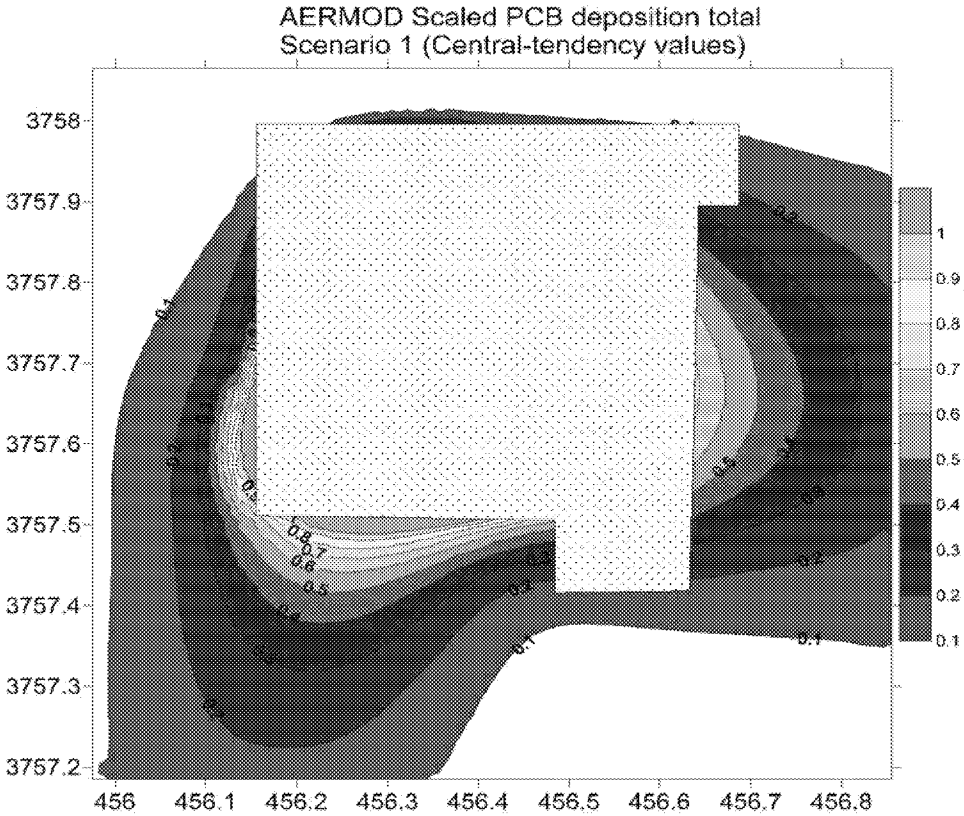

Figure 1B. Normalized (relative) distribution of PCB deposition from windblown dust obtained from AERMOD modeling of Scenario 1. Coordinates along the x- and y-axis are UTM coordinates (km).

11/16/2016 Page 4

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Appendix

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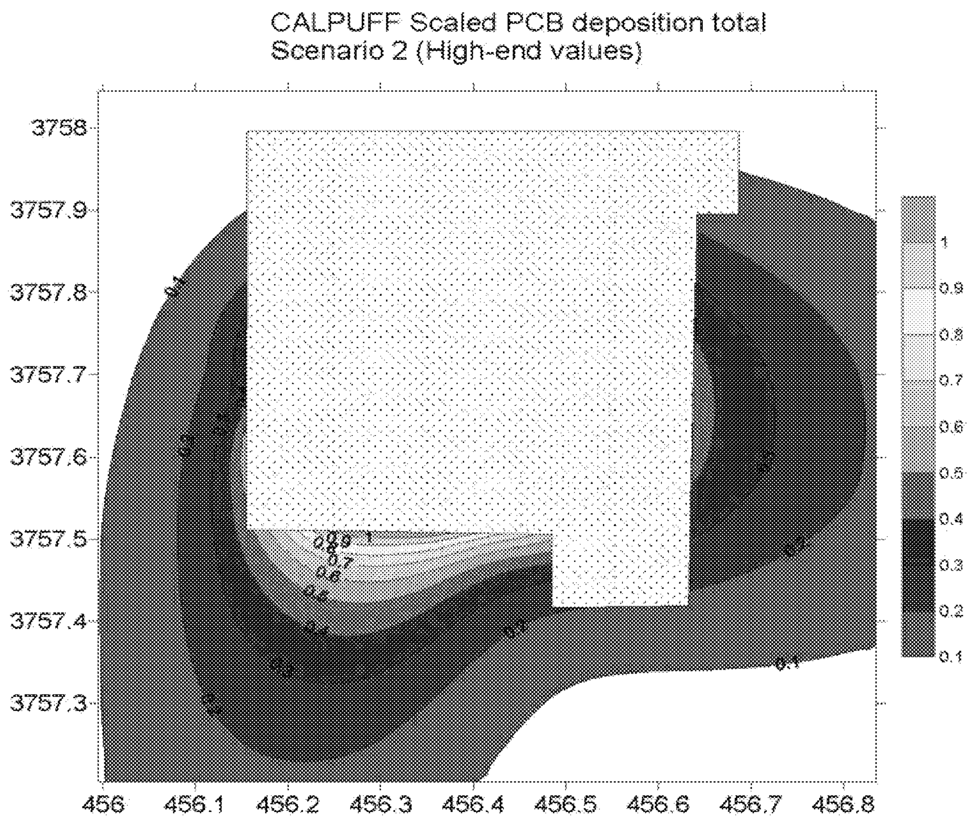

Figure 2A. Normalized (relative) distribution of PCB deposition from windblown dust obtained from CALPUFF modeling of Scenario 2. Coordinates along the x- and y-axis are UTM coordinates (km).

11/16/2016 Page 5

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Appendix

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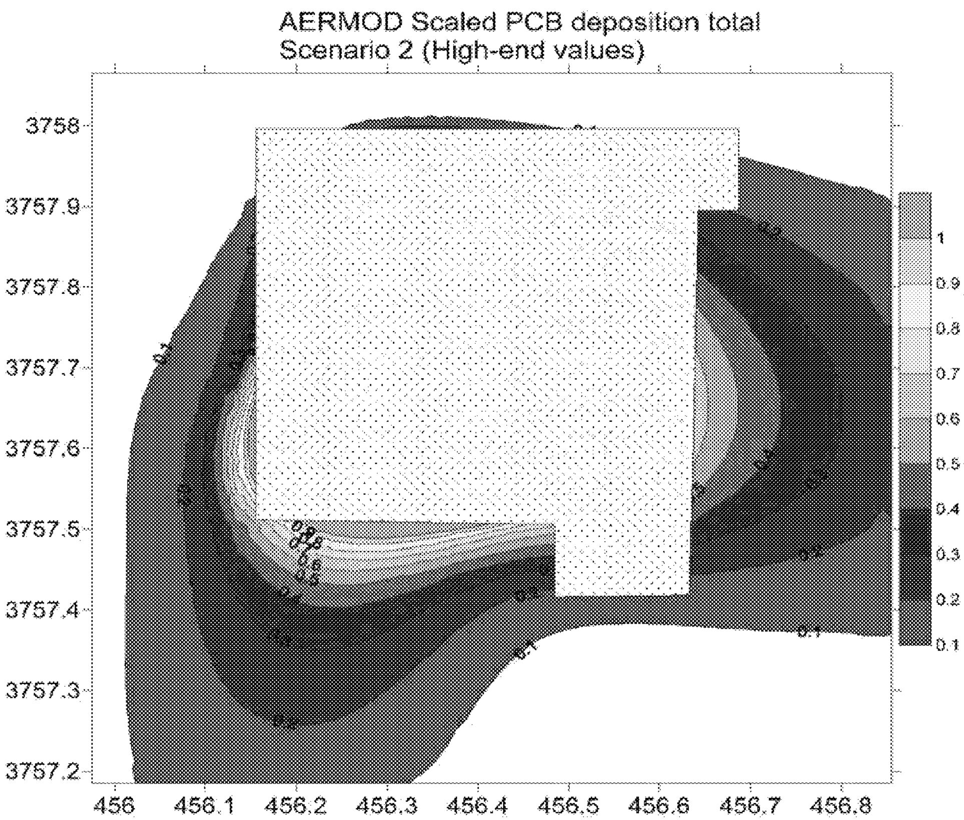

Figure 2B. Normalized (relative) distribution of PCB deposition from windblown dust obtained from AERMOD modeling of Scenario 2. Coordinates along the x- and y-axis are UTM coordinates (km).

11/16/2016 Page 6

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Appendix

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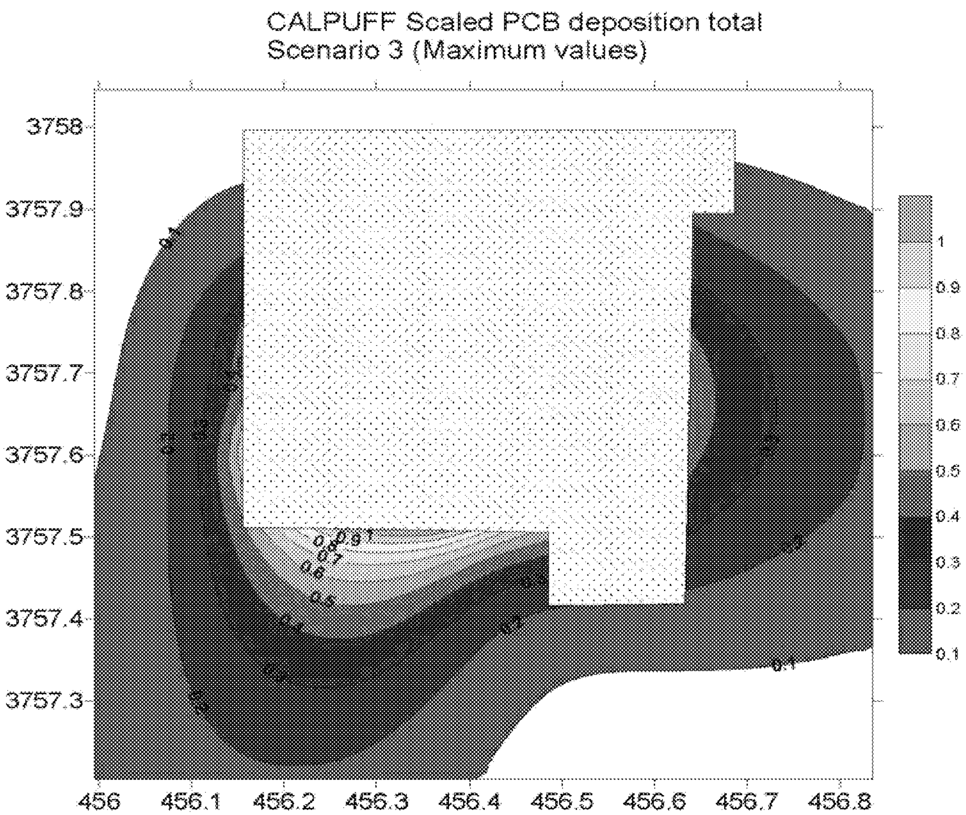

Figure 3A. Normalized (relative) distribution of PCB deposition from windblown dust obtained from CALPUFF modeling of Scenario 3. Coordinates along the x- and y-axis are UTM coordinates (km).

11/16/2016 Page 7

Appendix

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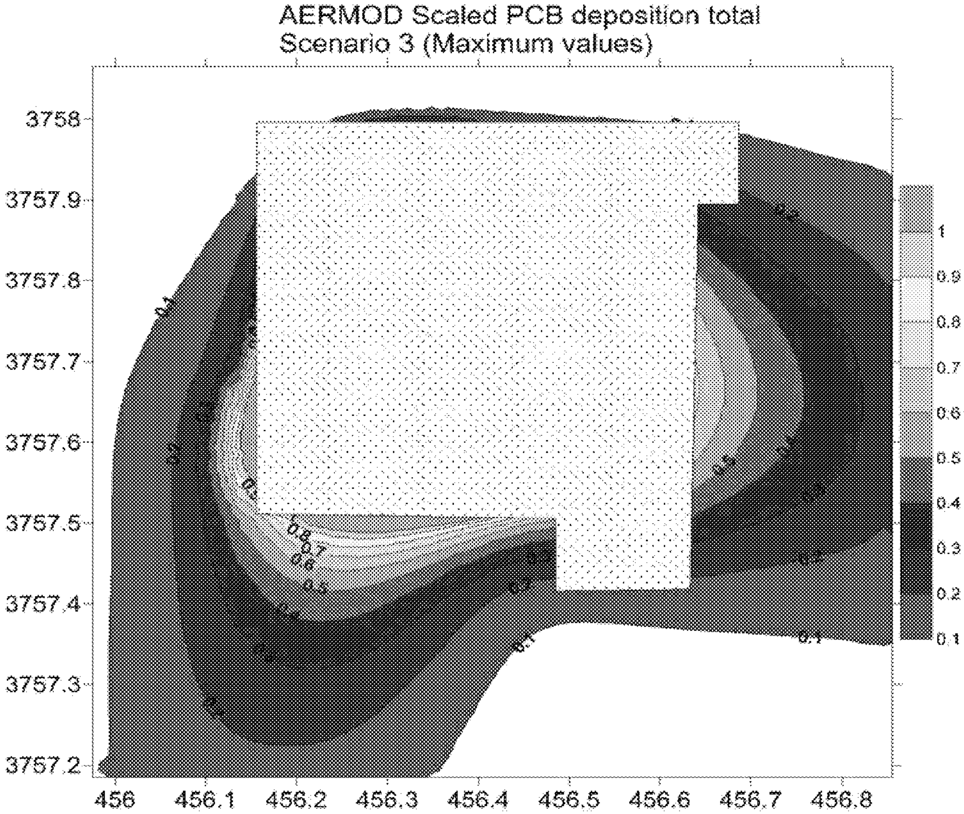

Figure 3B. Normalized (relative) distribution of PCB deposition from windblown dust obtained from AERMOD modeling of Scenario 3. Coordinates along the x- and y-axis are UTM coordinates (km).

11/16/2016 Page 8

ED_005263_00002967-00059

Appendix 3 Hazard Appraisal and Recognition Plan

Appendix